

A landscape photograph showing a mountain valley. In the foreground, there is a rocky, gravelly path or clearing with some low-lying vegetation. The middle ground is filled with dense evergreen forests. In the background, there are rolling hills and mountains under a dramatic, cloudy sky. A vibrant rainbow arches across the sky, starting from the left side and ending on the right. The overall mood is serene yet powerful due to the weather conditions.

Diesel Systems: The Low-Hanging Fruit?

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OCTOBER 16TH, 2012
HORNBERGER**

PHOTO BY GEORGE

Presentation Outline

- AEA Intro
- Powerhouse design and construction
- Heat recovery
- Tank farms
- EPA Regulatory Relief for rural Alaska
- Questions?



Before

Akiachak

After



Chitina

Before



After

Before



After



Before

Chignik Bay

After



Koyukuk

Before



After



Koyukuk

Before



After





Before

Crooked Creek

After



Crooked Creek

Before



After

Little Diomedé Powerhouse

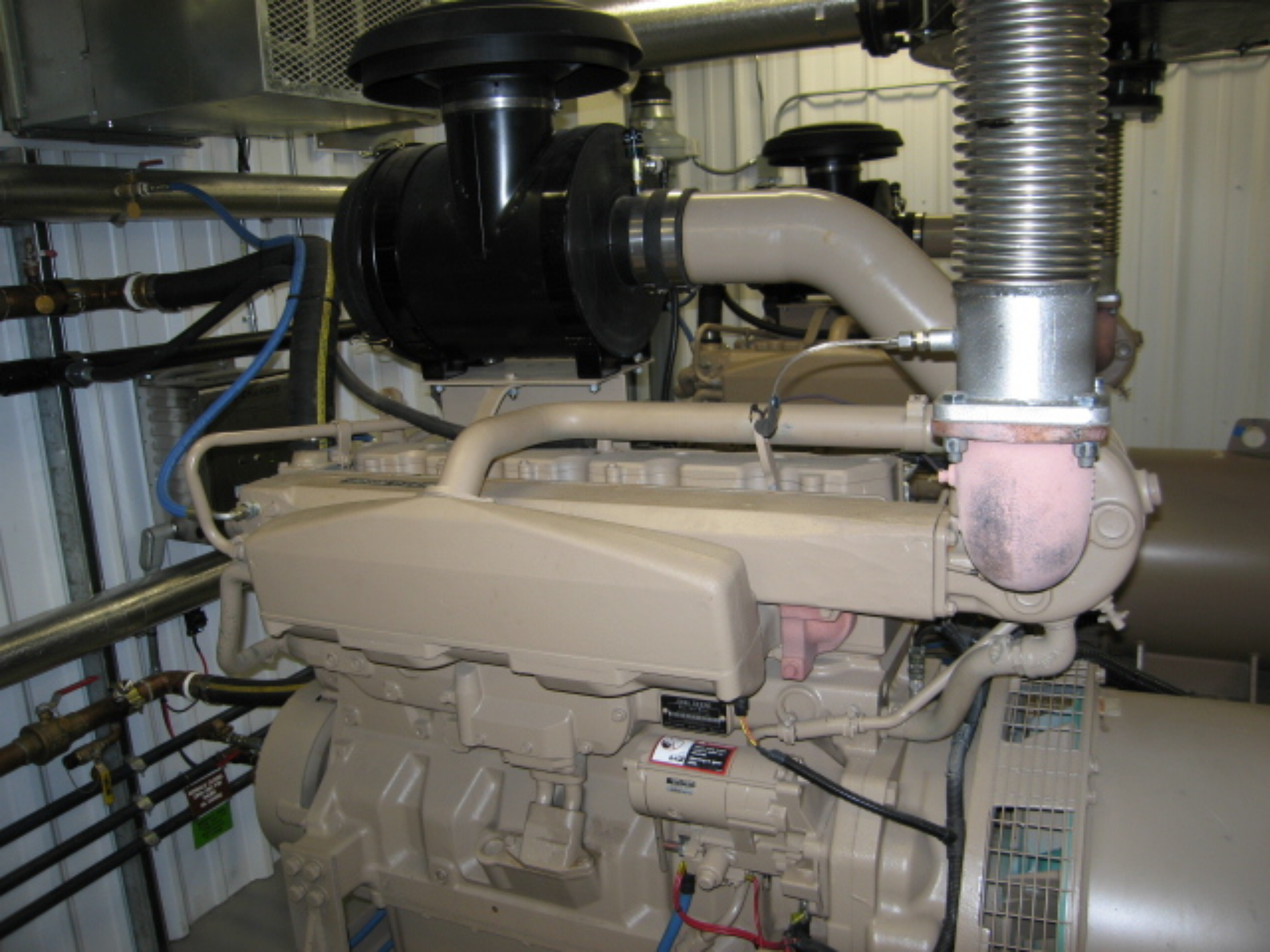
Big Diomedé

















Powerhouse Monitoring On-site or Remote



Automatic Load-sensing Switchgear





Satellite connectivity

Camera installation



Rural Power Systems Upgrade (RPSU) Program Project Status as of June 2012



Completed Projects	In Progress Projects	Phase	Remaining Projects	AVEC	North Slope Borough
Akiachak	Akiak	PH 3	Akhiok	Alakanuk	Anaktuvuk Pass
Akutan (distrib)	AVTEC	PH 3	Aniak	Ambler	Atkasuk
Angoon	Golovin	PH 3	Birch Creek	Anvik	Kaktovik
Arctic Village	Hoonah	PH 3	Chalkyitsik	Brevig Mission	Nuiqsut
Atka (pwrhs)	McGrath	PH 3	Chefornak (distrib)	Chevak	Point Hope
Atmautluak (distrib)	Newhalen	PH 3	Chignik Lagoon	Eek	Point Lay
Beaver	Pedro Bay	PH 3	Clarks Point	Ekwok	Wainwright
Buckland	Pelican (hydro)	PH 3	Cold Bay	Elim	
Chefornak (pwrhs)	Ruby (distrib)	PH 3	Deering (distrib)	Emmonak	
Chenega Bay	Takotna (distrib)	PH 3	Iliamna	Gambell	
Chignik Bay	Yakutat	PH 3	Kake	Goodnews Bay	
Chignik Lake	Central	PH 2	Kasaan	Grayling	
Chitina (pwrhs)	Chitina (hydro)	PH 2	Kipnuk	Holy Cross	
Chuathbaluk	Fort Yukon	PH 2	Kobuk	Hooper Bay	
Crooked Creek	Larsen Bay (pwrhs)	PH 2	Kongiganak (distrib)	Huslia	
Deering (pwrhs)	Saint George	PH 2	Kwigillinok (distrib)	Kaltag	
Diomedea	Atmautluak (pwrhs)	PH 1	Lake Minchumina	Kasigluk	
Elfin Cove	Egegik	PH 1	Lime Village	Kiana	
False Pass	Galena	PH 1	Manley Hot Springs	Kivalina	
Golovin	Koliganek	PH 1	Metlakatla	Koyuk	
Gustavus	Port Heiden	PH 1	Napaskiak	Lower Kalskag	
Hughes	Tatitlek	PH 1	Nelson Lagoon	Marshall	
Igiugig	Twin Hills	PH 1	Newtok	Mekoryuk	
Karluk			Nikolai	Minto	
King Cove			Nunam Iqua	Mountain Village	
Kokhanok			Perryville	New Stuyahok	
Kongiganak			Platinum	Nightmute	
Kotlik			Point Baker	Noatak	
Koyukuk			Port Alsworth	Noorvik	
Kwethluk			Port Protection	Nulato	
Kwigillingok			Rampart	Nunapitchuk	
Larsen Bay (hydro)			Red Devil	Old Harbor	
Levelock			Saint Paul	Pilot Station	
Manokotak			Sand Point	Pitka's Point	
Napakiak			Tanana	Quinhagak	
Nikolski			Telida	Russian Mission	
Ouzinkie			Tuntutuliak (distrib)	Saint Mary's	
Pedro Bay			Venetie	Saint Michael	
Pilot Point			Whale Pass	Savoonga	
Pelican (pwrhs)			White Mt (pwrhs)	Scammon Bay	
Ruby (pwrhs)				Selawik	
Sleetmute				Shageluk	
Stevens Village				Shaktolik	
Stony River				Shishmaref	
Takotna (pwrhs)				Shungnak	
Tazimina (hydro)				Stebbins	
Tenakee Springs				Teller	
Tuluksak				Togiak	
Unalakleet				Toksook Bay	
Tuntutuliak (pwrhs)				Tununak	
White Mt (distrib)				Upper Kalskag	
				Wales	

51 Projects Completed (at least substantially complete)

11 Projects in Construction Phase 3

5 Projects in Final Design Phase 2

7 Projects in Conceptual Design Phase 1

40 Projects Remaining

AK Power Co

Allakaket/Alatna
Bettles/Evansville
Chistochina
Coffman Cove
Craig
Eagle
Haines
Healy Lake
Hollis
Hydaburg
Klawock
Mentasta
Naukati
Northway
Skagway
Slana
Tetlin
Thorne Bay
Tok/Tannacross
Whale Pass

Communities connected to an Intertie

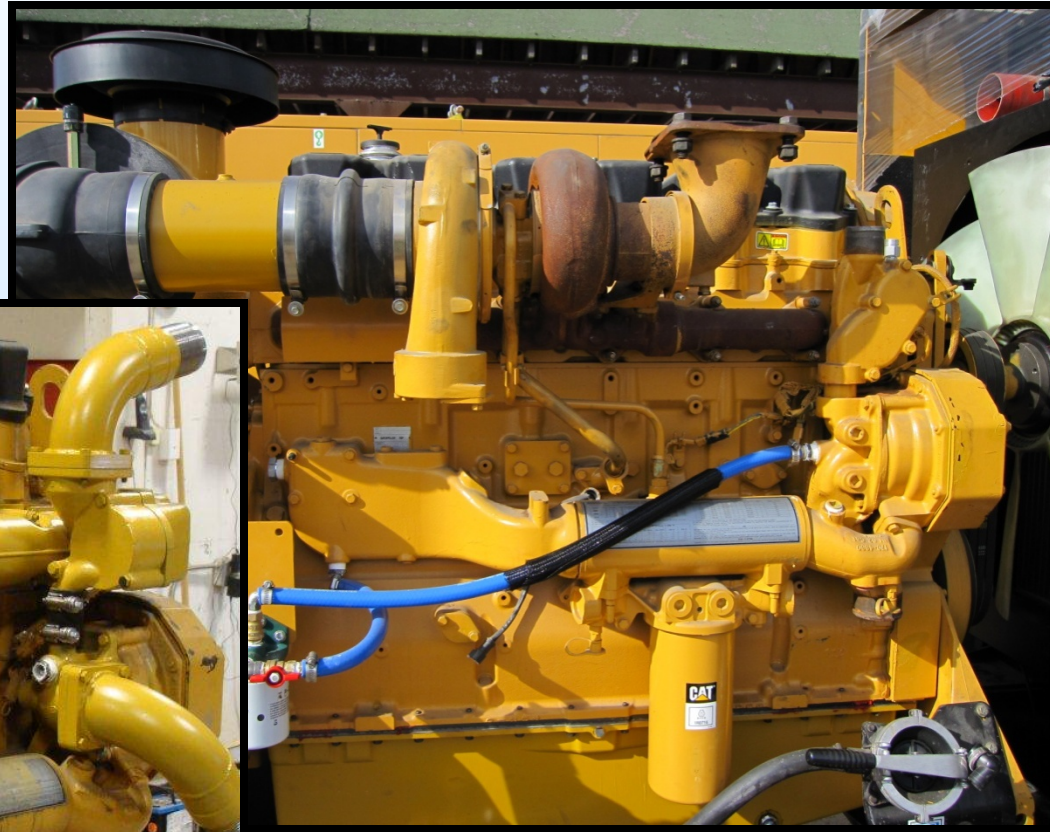
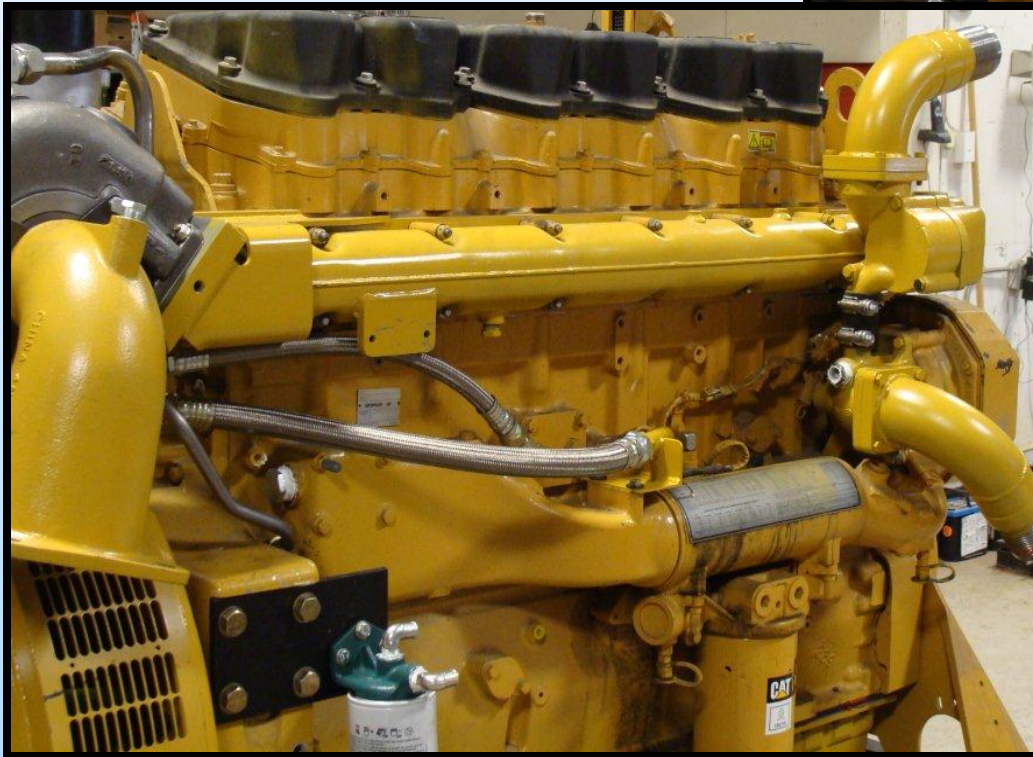
Klukwan
Naknek
Nanwalek
Napakiak
Newhalen
Nondalton
Oscarville
Port Lions
Seldovia
South Naknek

Communities which are served by AVEC, North Slope Borough, AK Power Co., or connected by intertie, are not part of AEA's Rural Power System Upgrade (RPSU) Program. For information on these communities contact the relevant entity.

Electrical Distribution in Chignik and Napakiak

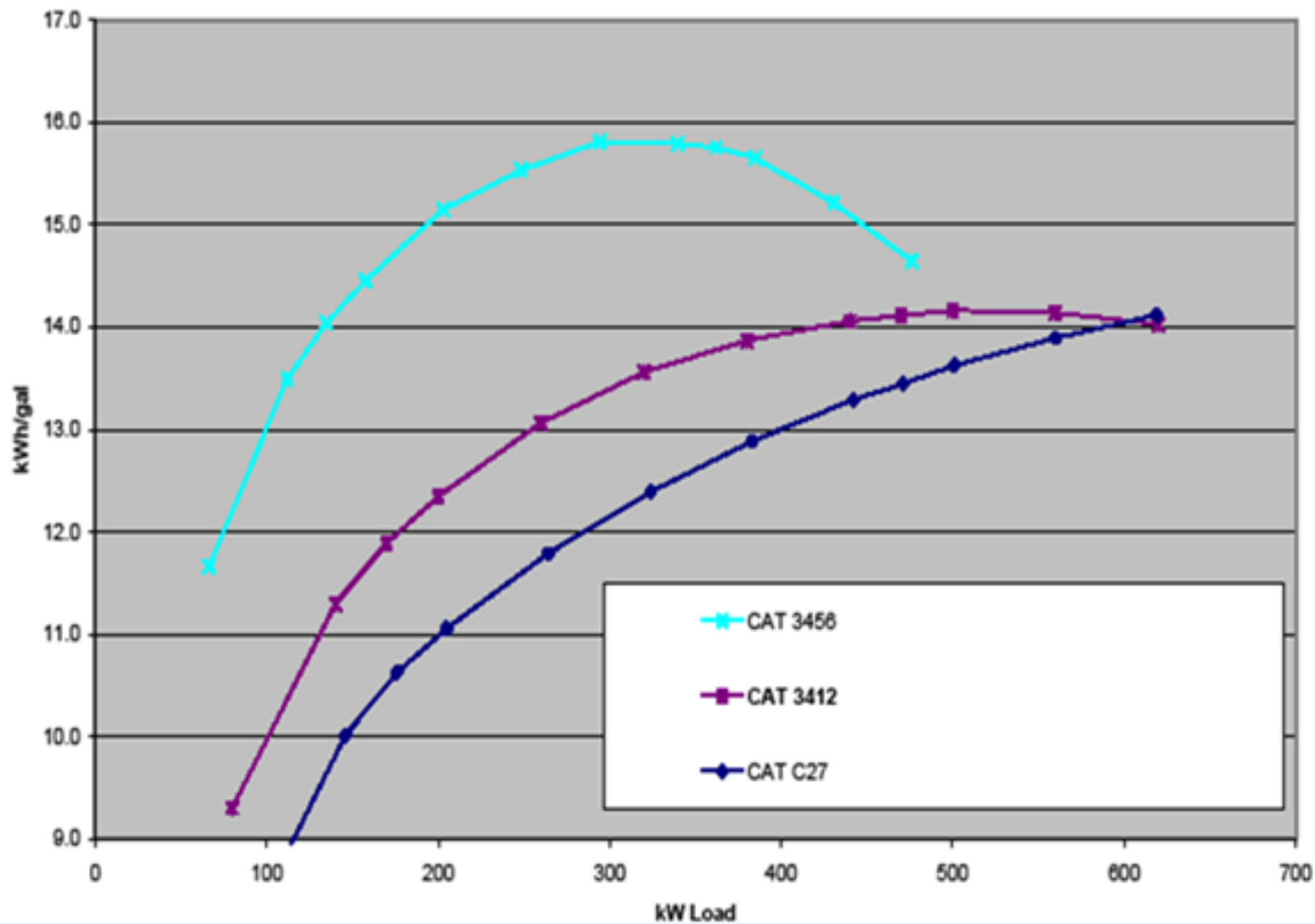


Wet Exhaust Manifold

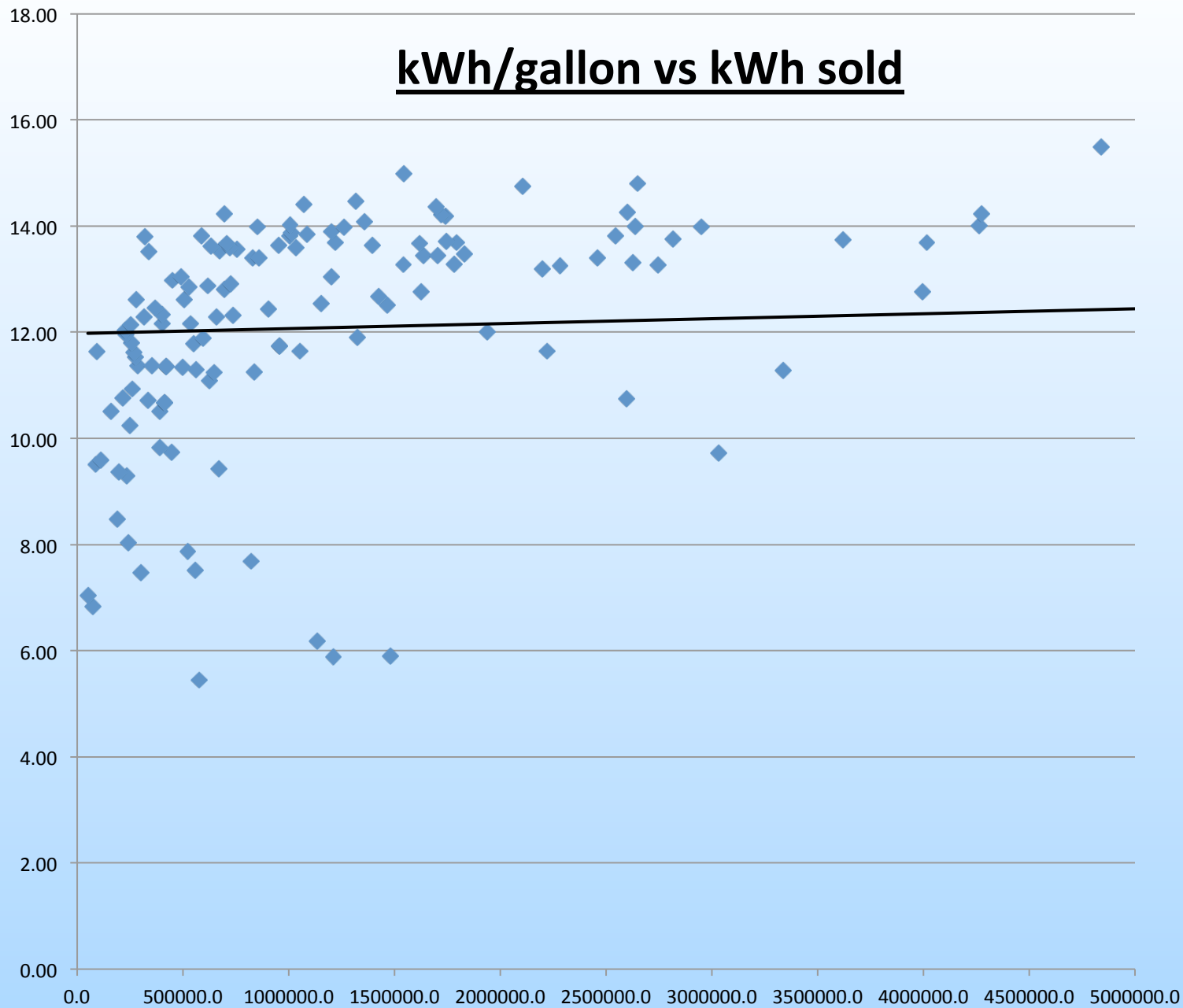


Normal Exhaust Manifold

CAT 3456 vs. CAT C27 and CAT 3412



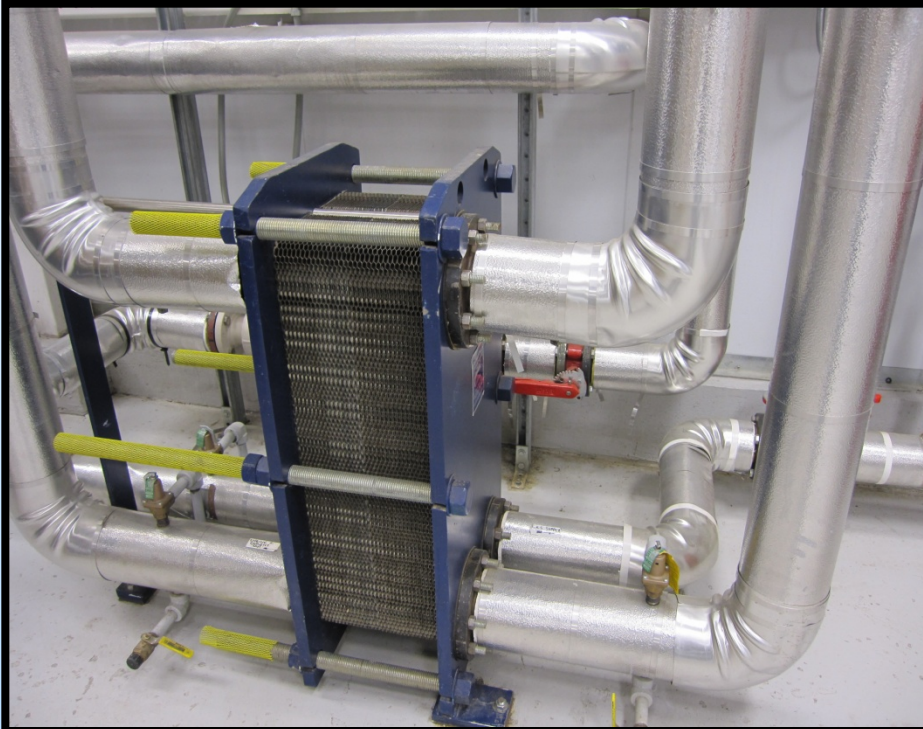
kWh/gallon vs kWh sold



$$y = 9E-08x + 11.974$$
$$R^2 = 0.06114$$

◆ Series1
— Linear (Series1)

Power Plant Heat Exchanger



Boiler Room Heat Exchanger

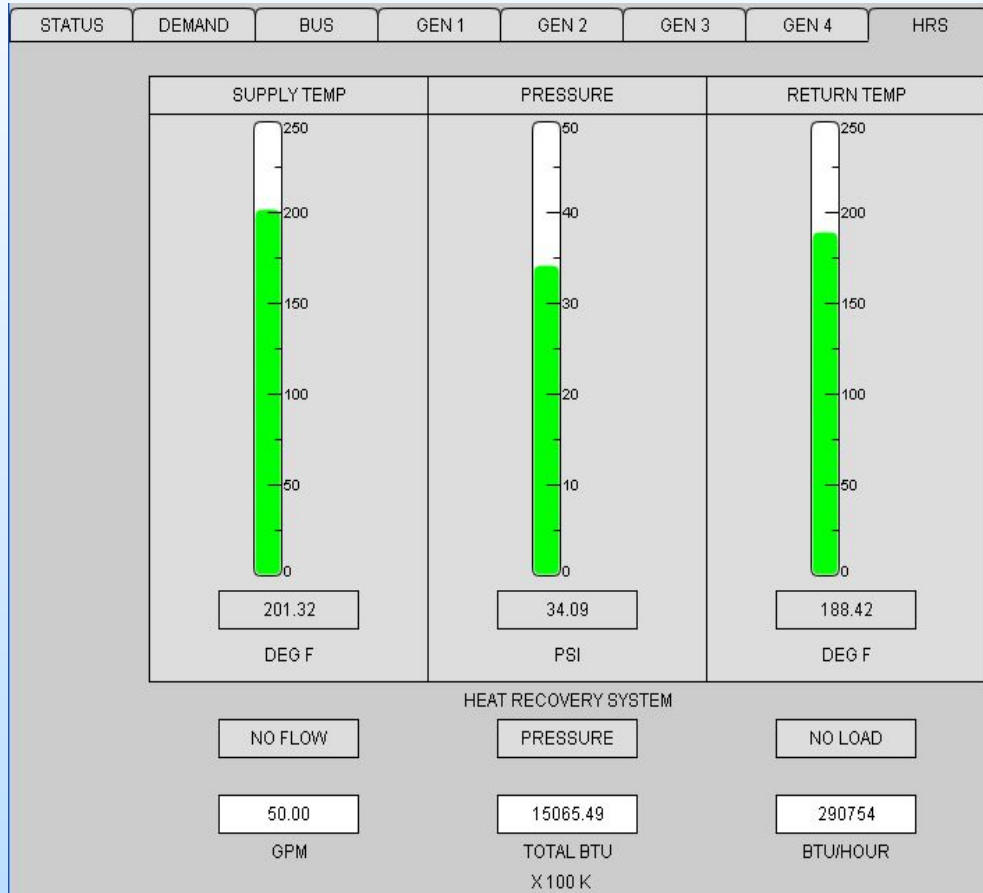


Simple Exhaust Heat Exchanger, “Stack Robber” in Chitina

Angoon



Waste Heat Capture from Village Power Plants



Remote Monitoring of Waste Heat Capture

15,000	Equivalent gallons of fuel saved at the municipal water treatment system in FY2009
\$57,900	Estimated avoided cost of fuel in FY2009 at a current cost of \$3.86 per gallon

The above information was gathered from the powerhouse SCADA system and PCE

Bulk Fuel Upgrades Program

Ruby

Before



After

Bulk Fuel Upgrades Program

Before



After

Hoonah





Before

Kongiganak

After

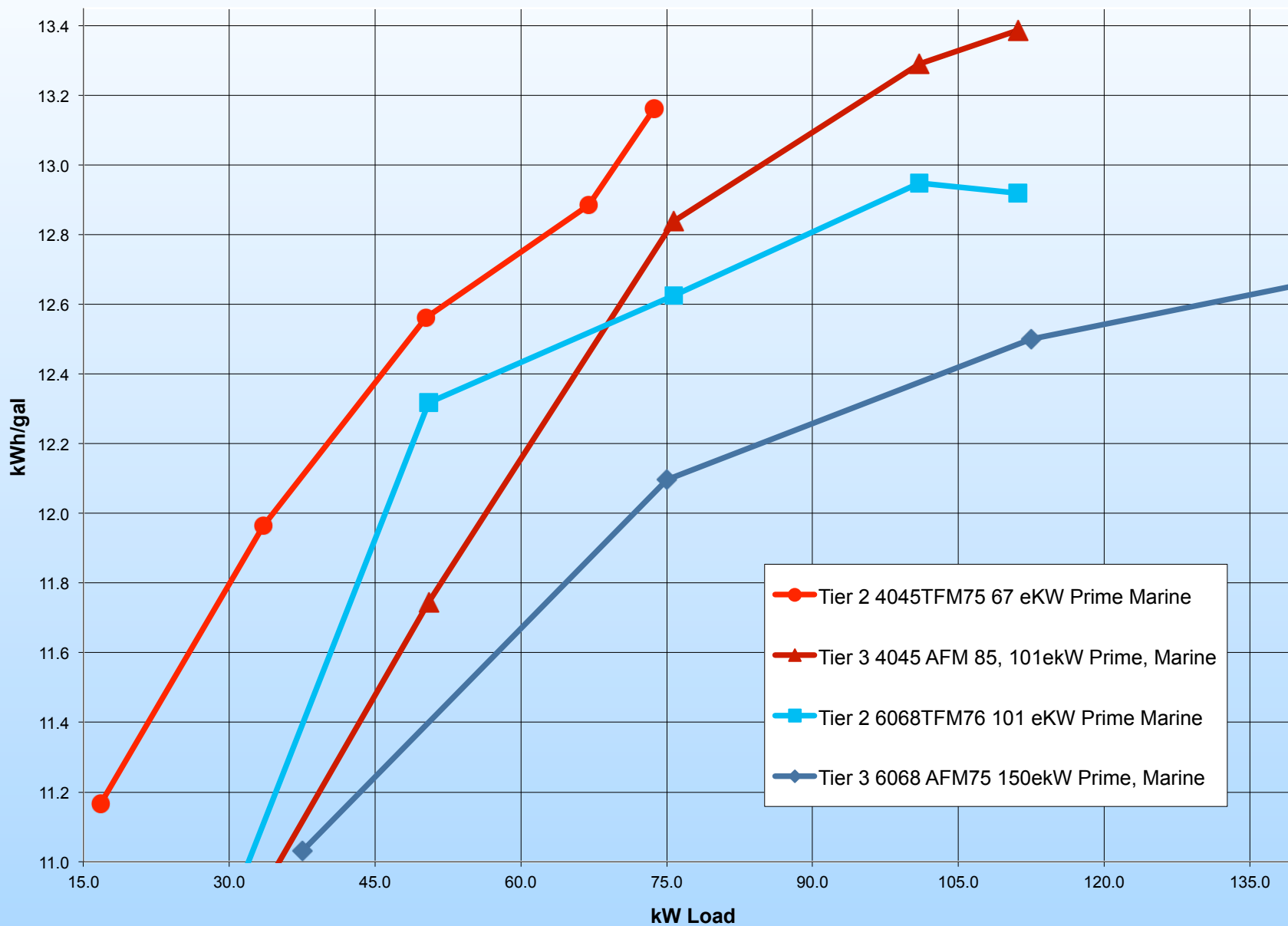


EPA Regulatory Relief

40 CFR Parts 60, 1039, 1042, et al

- 10/31/08: State of Alaska (AEA) requested alternative provisions to EPA's New Source Performance Standards (NSPS) for stationary engines
- Provisions apply to areas not accessible by Federal Aid Highway System. This generally applies to rural Alaska, with some exceptions for larger rural port cities.
- EPA determined that NO_x is not a criterion pollutant of importance in rural Alaska
- EPA granted rural Alaska a two year delay (until 2014) to comply with Tier 4 requirements for stationary engines
- EPA allows used oil blending up to 1.75% under certain conditions
- EPA approved the use of marine engines and marine engine standards rather than the land-based nonroad engine standards
- EPA removed the requirements to use aftertreatment devices

John Deere Tier 2 Marine vs. Tier 3 Marine



Questions?

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